

CLAIMS

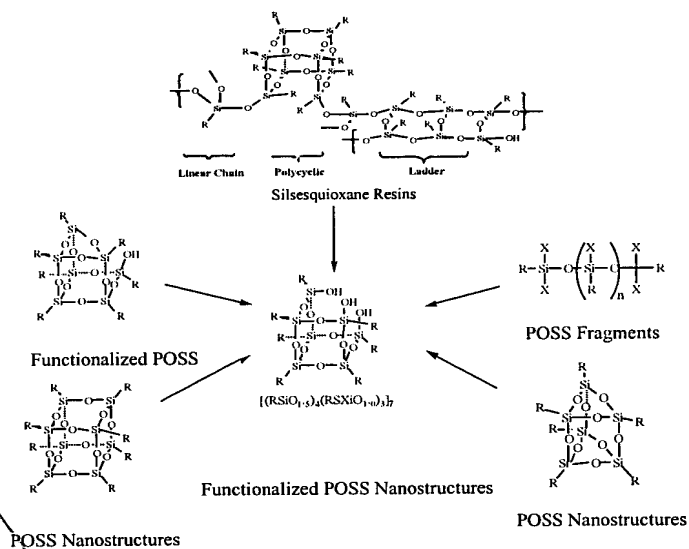
1. The process of using bases to convert polysilsesquioxane resins into POSS nanostructures of the type: homoleptic $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$, heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ and functionalized heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RXSiO}_{1.0})_n]_{\Sigma\#}$. Where m and n represent the stoichiometric composition and # = the number of silicon atoms contained within the nanostructure (aka cage size).

2. The process of using bases to convert POSS fragments $[(\text{RSiO}_{1.5})_m(\text{RXSiO}_{1.0})_n]_{\Sigma\#}$ into POSS nanostructures of the type homoleptic $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$, heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ and functionalized heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RXSiO}_{1.0})_n]_{\Sigma\#}$.

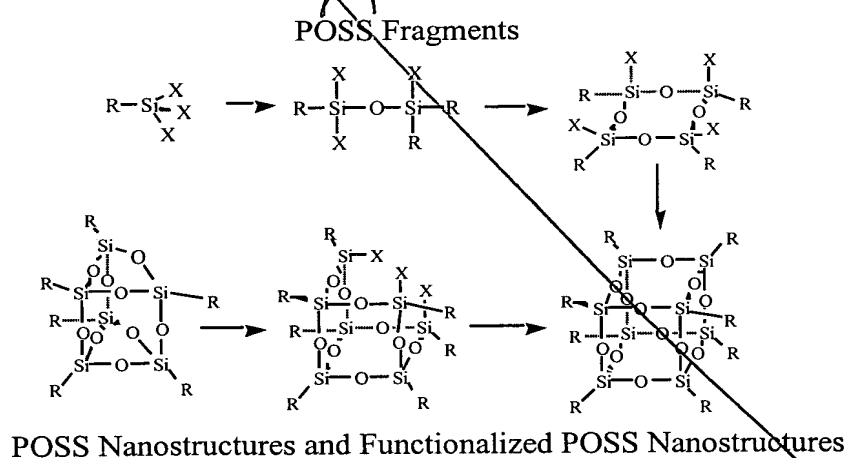
3. The process of using bases to convert POSS nanostructures homoleptic $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$, heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ into functionalized heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RXSiO}_{1.0})_n]_{\Sigma\#}$ POSS nanostructures.

4. The process of reacting POSS fragments with POSS and silicate nanostructures to form functionalized heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RXSiO}_{1.0})_n]_{\Sigma\#}$, $[(\text{XSiO}_{1.5})_m(\text{RXSiO}_{1.0})_n]_{\Sigma\#}$ POSS nanostructures.

5. The process of directly manufacturing $[(\text{RSiO}_{1.5})_4(\text{RXSiO}_{1.0})_3]_{\Sigma 7}$ from polysilsesquioxanes $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$, nonfunctionalized $[(\text{RSiO}_{1.5})_m(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ POSS cages, and POSS fragments $[(\text{RSiO}_{1.5})_m(\text{RXSiO}_{1.0})_n]_{\Sigma\#}$ using base as shown in the figure.



6. The process for the sequential growth of POSS fragments, homoleptic $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$, heteroleptic $[(\text{RSiO}_{1.5})_4(\text{RXSiO}_{1.0})_3]_{\Sigma\#}$ POSS nanostructures from POSS fragments using base, as shown in the figure.



7. The compositions reported in the examples for homoleptic $[(\text{RSiO}_{1.5})_n]_{\Sigma\#}$, heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RSiO}_{1.5})_n]_{\Sigma\#}$ and functionalized heteroleptic $[(\text{RSiO}_{1.5})_m(\text{RXSiO}_{1.0})_n]_{\Sigma\#}$ POSS and POSS silicate nanostructures.

ADD
A18

Add
B287